

Public Review Comment Matrix

Originating Office: AIR-6B0	Document Description: TSO-C212 TSO for Air-to-Air Radar (ATAR) for Traffic Surveillance	Project Lead/Reviewer Sheila Mariano	Reviewing Office: AIR-6B0	Date of Review: 9/8/2017
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	Commenter	Section # and Page #	Comment	Suggested Change and Rationale	Disposition
1.	Garmin	3.b.(3) Page 2	<p>Paragraph. 3.b.(3) includes the statement:</p> <p style="padding-left: 40px;">Design the system to at least the above failure condition classifications.</p> <p>Wording needs to change to allow failure condition to be determined at the aircraft level.</p> <p>This statement implies the failure condition classification of an appliance is determined by the TSO regardless of mitigations employed to meet aircraft level safety requirements such as redundant appliances/systems. Unless the DAL cannot be affected by the installation, the aircraft System Safety Assessment should determine the failure classification and by extension, the design assurance level (DAL) requirement. The AFHA/SFHA/PASA/PSSA ultimately determines the DAL requirement for a particular installation. Specifying the</p>	Suggest changing to the alternate wording identified in paragraph 3.b. of the TSO Template in Order 8150.1D Appendix G.	Disagree. No Change. The TSO provides the minimum level of design assurance levels accepted by the FAA. This alleviates the applicant burden of determining the level of safety needed for use of the system on a typical UAS installation. The FAA conducted a Safety Review Management Panel to verify the DAA failure classification level and the results provided assurance that the failure level referenced in this TSO is appropriate to ensure adequate level of safety needed for introduction in to the NAS. The TSO does not guarantee installation approval. The TC or STC applicant will need to assure the design assurance level is commensurate with the

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			DAL at the appliance level without the benefit of the specific AFHA/SFHA/PASA/PSSA means that in some cases the DAL will undoubtedly be higher and more costly than necessary. This will have a chilling effect on the installation of new, safety enhancing technologies since the cost will be greater than necessary. It is possible to build and certify a TSOA appliance that cannot be approved for installation in one or more aircraft types because it does not have the required DAL. Similarly, just because the appliance meets a TSO DAL does not mean it can be approved for installation. We recommend that no failure classification/DAL requirement be included in a TSO when the installation can affect or mitigate the hazard level and therefore consideration should be given to revising paragraph 3.c in this TSO to the general guidance in the Recommendation column.		aircraft type design. However, if a lower level of design assurance is requested at the TSO level, then the applicant is free to request a deviation approval to the TSO.

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2.	Garmin	3.e Page 4	The paragraph references “AC 20-115C, <i>Airborne Software Assurance</i> , dated July 19, 2013”. AC 20-115C will soon be replaced by AC 20-115D.	Reference “AC 20-115C or later version”, or simply reference AC 20-115D. A draft of A(M)C 20-115D, a follow-on version of AC 20-115C which will be harmonized with EASA’s AMC, was recently released by EASA for public comment (ref. EASA NPA 2017-12), and the published AC 20-115D is expected by July 2017.	Agree. Revised to read “AC 20-115C or latest revision.” This change will also be incorporated into the TSO template in appendix G of Order 8150.1D. We did not include AC 20-115D because this TSO is slated to publish before AC 20-115D.
3.	Garmin	3.f Page 2	Including this specific DO-254 reference is redundant to the rest of the paragraph in this section. For custom electronic hardware determined to be simple, RTCA/DO-254, paragraph 1.6 applies. DO-254 makes it clear how to address “simple” custom airborne electronic hardware.	Remove this reference to DO-254 Paragraph 1.6.	Disagree. The intent of referencing DO-254 section 1.6 for simple custom devices in the template is to complement the previous template sentence which only addresses complex custom devices. The inclusion of section 1.6 ensures that the verification and configuration management processes

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					required by DO-254 for simple devices are performed and the resulting data artifacts for these processes are created.
4.	Garmin	4.b.(2) Page 3	<p>Paragraph 4.b.(2) states:</p> <p>Each subassembly of the article that you determined may be interchangeable.</p> <p>This language is confusing.</p>	<p>The language for this requirement is confusing. This could mean that a stuffed printed circuit board needs the TSO number.</p> <p>Suggest removing the statement or updating to wording identified in paragraph 4.b. of the TSO Template in Order 8150.1D Appendix G.</p>	Agree. For this TSO application the component markings do not apply as does the DAA equipment. Removed paragraph to be consistent with TSO template per requested change.
5.	Garmin	5.a.(3) Page 3	<p>The paragraph states to include the following statement:</p> <p>This article meets the minimum performance and quality control standards required by a technical standard order (TSO). Installation of this article requires separate approval.</p>	<p>Update to align with the text in the TSO Template in Order 8150.1D Appendix G:</p> <p>This article meets the minimum requirements of {insert the TSO number and revision</p>	Agree. Revised according to the latest template in FAA Order 8150.1D.

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			This text does not align with the text identified in the TSO Template in Order 8150.1D Appendix G.	letter}. Installation of this article requires separate approval.	
6.	Garmin	5.f Page 4	<p>Paragraph. 5.f includes the statement:</p> <p>Identify functionality or performance contained in the article not evaluated under paragraph 3 of this TSO (that is, non-TSO functions). Non-TSO functions are accepted in parallel with the TSO authorization. For those non-TSO functions to be accepted, you must declare these functions and include the following information with your TSO application:</p> <p>The GAMA 16-28 “Industry Recommendations on the Management of Non-Technical Standard Order Functions” Recommendation 2 recommended revising the Appendix G TSO template to remove “or performance” from the quoted paragraph 5.f statement to ensure non-TSO function</p>	<p>1) Remove “or performance” in accordance with the GAMA non-TSO function recommendations.</p> <p>2) Update Order 8150.1D Appendix G paragraph 5.f in accordance with the GAMA recommendations.</p> <p>Work with GAMA to address all the non-TSO function recommendations.</p>	Agree. Coordinated with the TSO template policy program manager. Removed “or performance” as suggested. The words “or performance” will be removed from the TSO template in appendix G of Order 8150.1D during the next revision.

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			definitions are “fully aligned with the original intended N8150.3 definition”. This recommendation was not followed when FAA Order 8150.1D was published.		
7.	Garmin	5.f.(5) and 5.f.(6) Page 5	<p>These sections state the following:</p> <p>(5) Test plans, analysis and results, as appropriate, to verify that performance of the hosting TSO article is not affected by the non-TSO function(s).</p> <p>(6) Test plans, analysis and results, as appropriate, to verify the function and performance of the non-TSO function(s) as described in paragraph 5.f.(1).</p> <p>The bolded text “and results” is not included in the TSO Template in Order 8150.1D Appendix G.</p>	Remove the text “and results” to align with the TSO Template in Order 8150.1D Appendix G.	Agree. Revised according to the latest template in FAA Order 8150.1D. TSO Policy holder clarified to us that non-TSO functions are not validated and are only checked on a non-interference basis to the TSO functions for TSO approval.
8.	Garmin	5.g. Page 5	This paragraph does not align with the TSO Template in Order 8150.1D Appendix G. Additionally section 5.h. in the TSO Template in Order 8150.1D	Align these sections of the TSO with the TSO Template in Order 8150.1D Appendix G.	Agree. Revised according to the latest template in FAA Order 8150.1D.

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			Appendix G is not included in this TSO draft.		
9.	Garmin	6.h. Page 6	“DO-254, Appendix A, Table A-1” should be “DO-254, Appendix A, Table A-1” (a letter l (L) is used instead of the number 1 (one)).	Update the “l” to a “1”.	Agree. They look the same. 1 was replaced with l.
10.	Garmin	7. Page 6	<p>This paragraph does not include the following text in Section 7.c. in the TSO Template in Order 8150.1D Appendix G:</p> <p style="padding-left: 40px;">c. If the article contains software, include one copy of the OPR summary.</p> <p>This is good because per Order 8150.1D Appendix G paragraph 7, the OPR summary is considered “furnished data” required to be provided to any “entity (such as an operator or repair station)” that is furnished “articles manufactured under this TSO”. Operators and repair stations typically do not have the same capability as a TC/STC design approval holder to make an appropriate assessment of OPR effect. Consequently, it will only serve to cause confusion to require an</p>	Remove paragraph 7.c from Order 8150.1D Appendix G or limit its scope so that the OPR summary only needs to be provided to TC/STC design approval holders.	<p>Partially Agree. Paragraph 7.c was modified as follows:</p> <p style="padding-left: 40px;">c. If the article contains software, provide one copy of the Open Problem Report (OPR) summary to type certification, supplemental type certification, or amended type certification design approval holders or applicants seeking installation approval of the TSO.</p>

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			OPR summary to be provided to operators and repair stations. This same concern has been raised in the context of the FAA/EASA/Industry A(M)C 20-OPR discussions.		
11.	R. Joslin- FAA	Section 3(a) Page 1	Incorrect definition of “non-cooperative traffic” .	Rationale: An aircraft that is equipped with a transponder/ADS-B(Out) would still be considered non-cooperative if that equipment was not operating wither due to a malfunction or deliberate action, hence the definition needs to be corrected, which would also make it consistent with the DAA MOPS definition. Suggested Change: Add the phrase “ <i>or not operating such equipment due to malfunction or deliberate action</i> ”, to the parenthetical	Agree. Revised according to the suggested change.

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				<p>statement at the end of the sentence to read as follows:</p> <p>The on-board radar complements other on-board airborne surveillance sensors by providing detection of non-cooperative traffic (aircraft without surveillance transponders or Automatic Dependent Surveillance-Broadcast Out capability. <i>or not operating such equipment due to malfunction or deliberate action.</i>)</p>	